

Appl. No. 10/081,465
Amdt. dated June 3, 2004
Reply to Office action of December 4, 2004

Docket No. 58091-010500

AMENDMENTS TO THE CLAIMS

The listing of claims will replace without prejudice, all prior versions, and listings, of claims in the application

Claim 1 (original). A thin wall singulation saw blade for cutting hard materials, comprising: a plated nickel matrix for encapsulating large diamonds and small diamonds in the same matrix, said nickel matrix having points of the large diamonds protruding from side walls beyond the small diamonds, and said small diamonds being encapsulated inside the thin wall matrix in a high-density concentration.

Claim 2 (currently amended): A thin wall singulation saw blade as set forth in claim 1 wherein said thin wall of said matrix is ~~serpentine or corrugated in shape and having a depth of corrugation which is 3 to 10 times the thickness of said thin walls of said matrix.~~

Claim 3 (currently amended): A thin wall singulation saw blade as claimed in claim 1, wherein the a cutting area of matrix material in said side walls exceeds the total thin wall area between the side walls and the side walls wear slower than the area between the side walls.

Claim 4 (currently amended): A thin wall singulation saw blade as claimed in claim 3, further comprising transition walls connecting and separating the side walls therebetween, the side walls and the transition walls extending from a cutting edge of the saw blade along a surface of the saw blade, wherein, after cutting the transition walls become concave along the cutting edge of the saw blade, thus forming recesses between the side walls wherein the saw blade becomes concave at the cutting edge and the center of the blade becomes recessed between two parallel cutting side blades.

Claim 5 (original): A thin wall singulation saw blade as claimed in claim 2 wherein said saw blade further includes a large circular metal blank, and said matrix material is provided with an portion for connecting the thin wall singulation saw blade to said circular metal blank.

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Claim 6 (currently amended): A thin wall singulation saw blade as claimed in claim 2, wherein said saw blade further includes an endless flexible ribbon, and said matrix material is provided with an adapter portion for connecting the thin wall singulation saw blade to said endless flexible blade ribbon.

Claim 7 (original): A thin wall singulation saw blade as claimed in claim 2, wherein said saw blade further includes a drill rod or pipe, and said matrix material is provided with an adapter portion for connecting a cylindrical thin wall singulation blade to said drill rod or pipe.

Claim 8 (currently amended): A thin wall singulation saw blade for cutting hard materials, comprising:

~~an mandrel~~ or a corrugated shaped blade of substantially uniform thickness comprising a plated matrix material having a corrugation;

large diamonds encapsulated in the thin walls material, and having small points or protrusion extending from the thin walls on both sides;

small diamonds in the thin walls between and around said large diamonds;

said small diamonds being encapsulated in higher density by volume than said large diamonds; and

the depth of said ~~inundation~~ corrugation being greater than the thickness of said thin wall by a ratio of greater than three to one.

Claim 9 (original): The method of making a thin wall singulation saw blade, comprising:

providing a mandrel having a corrugated shape;

plating a uniform thin wall of matrix metal in the presence of large diamonds;

initially plating enough matrix metal to entrap and hold the large diamonds in place;

substituting small diamonds for large diamonds;

plating and encapsulating the small diamonds in the matrix material;

ceasing plating of said matrix material before points or protrusions of the large diamonds are covered; and

removing said thin wall corrugated shaped singulation saw blade from said mandrel, with points of the large diamonds exposed and protruding thorough said thin wall.

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Claim 10 (original): The method as claimed in claim 9, wherein the step of plating a uniform thin wall of matrix of metal comprises the step of limiting the uniform thickness wall to one third to one tenth of the depth of the corrugated shape.

Claim 11 (original): The method as claimed in claim 9, further comprising the step of initially plating a copper layer in the presence of diamonds in the range of 50 to 80 microns; and plating the copper layer to a thickness of 5 to 15 microns.

Claim 12 (original): The method as claimed in claim 11, wherein the plating and encapsulating of the matrix metal comprises plating nickel in the presence of diamonds in the range of 3 to 18 microns; and plating a nickel layer having a thickness less than said large diamonds.

Claim 13 (original): The method as claimed in claim 9, wherein the plating of a uniform thick wall of matrix metal comprises the step of plating a corrugated annular ring saw blade for use in a flanged clamping hub.

Claim 14 (original): The method as claimed in claim 13, further comprising cooling the side walls of said corrugated saw blade with water when cutting.

Claim 15 (original): The method as claimed in claim 9, further comprising providing an attachment tab or flange on said thin wall saw blade, and attaching said thin wall saw blade to a carrier or support.

Claim 16 (original): The method as claimed in claim 15, wherein the attaching said thin wall saw blade to a carrier comprises attaching the flange to a hub, disc, rod or flexible blade.

Claim 17 (new): A thin wall singulation saw blade for cutting hard materials, comprising:

- (a) a plated matrix for encapsulating large diamonds and small diamonds in the matrix;
- (b) said small diamonds being encapsulated inside the thin wall matrix in a high-density concentration;

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- (c) the thin wall singulation saw blade being corrugated with substantially uniform thickness and comprising raised surfaces and lowered surfaces;
- (d) the lowered surfaces being parallel to, and spaced laterally and longitudinally of, the raised surfaces; and
- (e) transition portions connecting the raised surfaces and the lowered surfaces.

Claim 18 (new): A thin wall singulation saw blade as claimed in claim 17, wherein the transition portions are at an angle to the raised surfaces and the lowered surfaces.

Claim 19 (new): A thin wall singulation saw blade as claimed in claim 19, wherein the angle is 45 degrees.

Claim 20 (new): A thin wall singulation saw blade as claimed in claim 17, wherein the raised portions and the lowered portions are substantially flat.

Claim 21 (new): A thin wall singulation saw blade as claimed in claim 3, wherein the saw blade is concave at the cutting edge and the center of the blade is recessed between two parallel cutting side blades.

Claim 22 (new): A thin wall singulation saw blade for cutting hard materials, comprising:

- (a) a corrugated shaped blade of substantially uniform thickness comprising a plated matrix material;
- (b) large diamonds encapsulated in the thin matrix material;
- (c) small diamonds in the matrix material between and around said large diamonds;
- (d) said small diamonds being encapsulated in higher density by volume than said large diamonds;
- (e) the corrugated shaped blade comprising raised surfaces and lowered surfaces parallel to, and spaced laterally and longitudinally of, the raised surfaces;
- (f) transition portions connecting the raised surfaces and the lowered surfaces; and
- (g) the depth of said corrugations being greater than the thickness of said thin wall by a ratio of greater than three to one.

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Claim 23 (new): A method of making a thin wall singulation saw blade, comprising:

- (a) providing a mandrel having a corrugated shape;
- (b) plating a uniform thin wall of matrix metal in the presence of large diamonds;
- (c) initially plating enough matrix metal to entrap and hold the large diamonds in place;
- (d) substituting small diamonds for large diamonds;
- (e) plating and encapsulating the small diamonds in the matrix material;
- (f) ceasing plating of said matrix material; and
- (g) removing said thin wall corrugated shaped singulation saw blade from said mandrel.